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Scientists debate ways to rid ground water of perchlorate

By Keith Rogers
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From using microscopic bugs to break up its chemical bonds to filtering it out with membranes, scientists said Wednesday they are moving quickly to develop systems to rid ground water of the rocket fuel ingredient perchlorate.

One cleanup method that uses microorganisms — a type of bacteria — has been shown to destroy perchlorate on a pilot scale.

Another, "the next best candidate," said Wayne Praskins of the Environmental Protection Agency's Superfund Division, is being tested in California, where dozens of wells downstream of aerospace and explosives industries have been contaminated.

The ion-exchange method replaces perchlorate ions with chloride ions, which renders the water safe of the highly soluble salt.

All of the methods that were discussed Wednesday at a public forum in Henderson require pumping ground water to the surface for treatment, Praskins said.

He said some type of treatment method will be needed at sources in the Las Vegas Valley that are contaminating Lake Mead and the lower Colorado River system.

Environmental scientists are focusing their efforts upstream of the Las Vegas Wash near Henderson where the compound ammonium perchlorate was produced for more than four decades at two plants: Kerr-McGee Chemical Corp. and American Pacific Corp.'s PEPCON facility, which was destroyed by explosions in 1988.

The forum, which ends today at the Henderson Convention Center, is sponsored by the Interagency Perchlorate Steering Committee, a group of experts from state and federal agencies that was formed to resolve problems from the production of rocket fuel oxidizers for space and military needs.

The Air Force, a major consumer of ammonium perchlorate, has been studying ways to treat such contamination for eight years, but awareness about perchlorate's presence in water supplies was heightened last year. And a nationwide search was launched to find ways to clean it up.

In Southern Nevada, perchlorate levels ranged from 3.7 million parts per billion in ground water at the Kerr-McGee plant to 8 parts per billion at Hoover Dam and 11 parts per billion in treated drinking water from Lake Mead. One part per billion is about the same as a grain of sand in an Olympic-size swimming pool.

The health concern about consuming perchlorate is its effect on the thyroid gland's ability to produce hormones for growth and development.

Scientists are nearing completion of eight studies that will help them understand what levels, if any, are acceptable in drinking supplies.

California has a temporary standard of 18 parts per billion that triggers remedial actions. The state is the only one with such a standard.

"If levels in the Colorado River aren't levels of concern, then there will be no need to spend lots of money to address those risks," Praskins said.

Researcher John Catts of Baldwin Park, Calif., said an experimental system of tanks that treats ground water has demonstrated that microorganisms can treat perchlorate in low concentrations at costs between $100 and $200 an acre-foot. An acre-foot is enough water to supply an average family for a year.

After five months in operation, this system reduced perchlorate to nondetectable levels, he said.

One of the drawbacks with biological methods for treating drinking water supplies is getting approval for a nonconventional technique that involves microorganisms, said Ed Urbansky of the EPA's National Risk Management Research Laboratory in Cincinnati.

Praskins noted, however, one biological treatment plant for perchlorate is under construction near Sacramento, Calif. The plant is designed to treat 4,000 gallons of water per minute, he said.

Sun Liang of the Metropolitan Water District of Southern California said his agency's research of membrane filters showed that two different kinds can remove low levels of perchlorate in water. The membrane technology, considered expensive, consistently removes 80 percent of perchlorate, he said.

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